REMARKS

The Office action dated August 27, 2003 and the cited references have been carefully considered.

Status of the Claims

Claims 1-35 are pending. Claims 4-6 and 12-14 are canceled. Therefore, claims 1-3, 7-11, and 15-35 remain in the current prosecution.

Claims 16-35 are allowed. The Applicants wish to thank the Examiner for indicating that claims 16-35 are allowed.

Claim 1 is rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Claims 1 and 6 are rejected under 35 U.S.C. § 102(a) as being anticipated by Derwent abstract for KR 2002003886 A. Claims 1-4 are rejected under 35 U.S.C. § 102(b) as being anticipated by JP 77 (52)-28745 B. Claims 1, 4-8, and 11-14 are rejected under 35 U.S.C. § 102(b) as being anticipated by Borchardt (U.S. Patent 3,282,856). Claims 1, 2, 4, and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Xiang et al. (U.S. Patent 6,048,469; hereinafter "Xiang"). Claims 2 and 3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Derwent abstract for KR 2002003886 A. Claims 3, 7-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 77 (52)-28745 B. Claims 2, 3, and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Borchardt. The Applicants respectfully traverse these rejections for the reasons set forth below.

References Submitted by the Applicants

The Applicants wish to thank the Examiner for noting that page 410 of the section of "Phosphor Handbook", which is cited in the Applicants' Information Disclosure Statement, is missing from the supplied pages of this reference. A copy of this page is attached herewith.

Claim Rejection Under 35 U.S.C. § 112, First Paragraph

Claim 1 is rejected under 35 U.S.C. § 112, first paragraph, because there is no support for the "phosphor being capable of absorbing at least 80% of exciting UV radiation

at wavelength of about 254 nm". Paragraph 0018 has been amended to include this description. No new matter has been added. Therefore, this rejection is now overcome.

Claim Rejection Under 35 U.S.C. § 102

Claims 1 and 6 are rejected under 35 U.S.C. § 102(a) as being anticipated by Derwent abstract for KR 2002003886 A. Claims 1-4 are rejected under 35 U.S.C. § 102(b) as being anticipated by JP 77 (52)-28745 B. Claims 1, 4-8, and 11-14 are rejected under 35 U.S.C. § 102(b) as being anticipated by Borchardt. Claims 4-6, and 12-14 are canceled. Therefore, the rejection of claims 4-6, and 12-14 is now moot. The Applicants respectfully traverse the rejection of claims 1-3, 7, 8, and 11 because none of the cited references discloses each and every element of each of the rejected claims.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a *single* prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). "The identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

The Derwent abstract for KR 2002003886 A discloses only a lanthanum gallate activated with europium.

In contradistinction, claim1 recites a phosphor having a formula of $(Gd_{1-x-y}Y_xLa_y)InO_3$: Eu^{3+}; wherein $0 \leq x, y \leq 1$, and $0 \leq x+y \leq 1$.

Since Derwent abstract for KR 2002003886 A does not disclose the exact composition recited in claim 1, Derwent abstract for KR 2002003886 A does not anticipate this claim.

JP 77 (52)-28745 B discloses only $GdAlO_3$:Eu. In contradistinction, claims 1-3 recites a phosphor having a formula of $(Gd_{1-x-y}Y_xLa_y)InO_3$: Eu^{3+}; wherein $0 \leq x, y \leq 1$, and $0 \leq x+y \leq 1$.

Since JP 77 (52)-28745 B does not disclose each and every element of each of claims 1-3, JP 77 (52)-28745 B does not anticipate these claims.

Borchardt discloses only $(RE_{1-x}Eu_x)\cdot Al_2O_3$ and $(RE_{1-x}Eu_x)\cdot Ga_2O_3$, wherein RE is Y, La, or Gd. In contradistinction, claims 1, 7, 8, and 11 recite a phosphor having a formula of $(Gd_{1-x-y}Y_xLa_y)InO_3$: Eu^{3+}; wherein $0 \leq x, y \leq 1$, and $0 \leq x+y \leq 1$.

Since Borchardt does not disclose the exact composition recited in each of claims 1, 7, 8, and 11, Borchardt does not anticipate these claims.

Claim Rejection Under 35 U.S.C. § 103(a)

Claims 1, 2, 4, and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Xiang. Claims 2 and 3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Derwent abstract for KR 2002003886 A. Claims 3, 7-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 77 (52)-28745 B. Claims 2, 3, and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Borchardt. Claims 4-6 and 12 are canceled. Therefore, the rejection of claims 4, 6, and 12 is now moot. The Applicants respectfully traverse the rejection of claims 1, 2, 3, 7-11, and 15 because the cited references do not teach or suggest all of the limitations of each of these claims.

"[T]he legal conclusion of obviousness [under 35 U.S.C. § 103(a)] requires that there be some suggestion, motivation, or teaching in the prior art whereby the person of ordinary skill would have selected the components that the inventor selected and used them to make the new device." *C.R. Bard, Inc. v. M3 Systems, Inc.*, 48 U.S.P.Q.2d 1225, 1231 (Fed. Cir. 1998). Thus, in order for the prior art to render the claimed invention obvious, all of the elements thereof must be taught or suggested in the prior art. "What must be found obvious to defeat the patentability of the claimed invention is the claimed combination." *The Gillette Co. v. S.C. Johnson & Son, Inc.*, 16 U.S.P.Q.2d 1923, 1927 (Fed. Cir. 1990).

"To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." "All words in a claim must be considered in judging the patentability of that claim against the prior art." MPEP § 2143.03 (8th ed., rev. 1, Feb. 2003).

Xiang does not teach or suggest a phosphor having a formula of $(Gd_{1-x-y}Y_xLa_y)InO_3$: Eu^{3+}; wherein $0 \leq x, y \leq 1$, and $0 \leq x+y \leq 1$, as is recited in claims 1 and 2. Thus, Xiang does not teach or suggest all of the limitations of claims 1 and 2. Therefore, claims 1 and 2 are patentable over Xiang under 35 U.S.C. § 103(a).

The Derwent abstract for KR 2002003886 A does not teach or suggest a   phosphor having a formula of $(Gd_{1-x-y}Y_xLa_y)InO_3$: Eu^{3+}; wherein $0 \leq x, y \leq 1$, and $0 \leq x+y \leq 1$, as is recited in claims 2 and 3. Thus, Derwent abstract for KR 2002003886 A does not teach or suggest all of the limitations of claims 2 and 3. Therefore, claims 2 and 3 are patentable over Derwent abstract for KR 2002003886 A under 35 U.S.C. § 103(a).

JP 77 (52)-28745 B does not teach or suggest a phosphor having a formula of $(Gd_{1-x-y}Y_xLa_y)InO_3$: Eu^{3+}; wherein $0 \leq x, y \leq 1$, and $0 \leq x+y \leq 1$, as is recited in claims 3 and 7-11. Thus, JP 77 (52)-28745 B does not teach or suggest all of the limitations of claims 3 and 7-11. Therefore, claims 3 and 7-11 are patentable over JP 77 (52)-28745 B under 35 U.S.C. § 103(a).

Borchardt does not teach or suggest a phosphor having a formula of $(Gd_{1-x-y}Y_xLa_y)InO_3$: Eu^{3+}; wherein $0 \leq x, y \leq 1$, and $0 \leq x+y \leq 1$, as is recited in claims 2, 3, and 15. Thus, Borchardt does not teach or suggest all of the limitations of claims 2, 3, and 15. Therefore, claims 2, 3, and 15 are patentable over Borchardt under 35 U.S.C. § 103(a).

In view of the above, it is submitted that the claims are patentable and in condition for allowance. Reconsideration of the rejection is requested. Allowance of claims at an early date is solicited.

Respectfully submitted,

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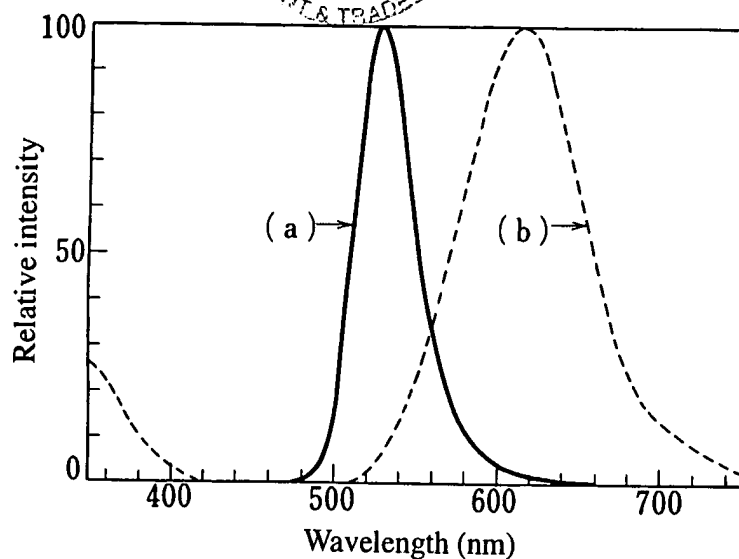Schenectady, New York
November 6, 2003

Figure 32 Emission spectra of (a) $Zn_2SiO_4:Mn^{2+}$ and (b) $CaSiO_3:Pb^{2+},Mn^{2+}$. (From Kamiya, S. and Mizuno, H., unpublished results. With permission.)
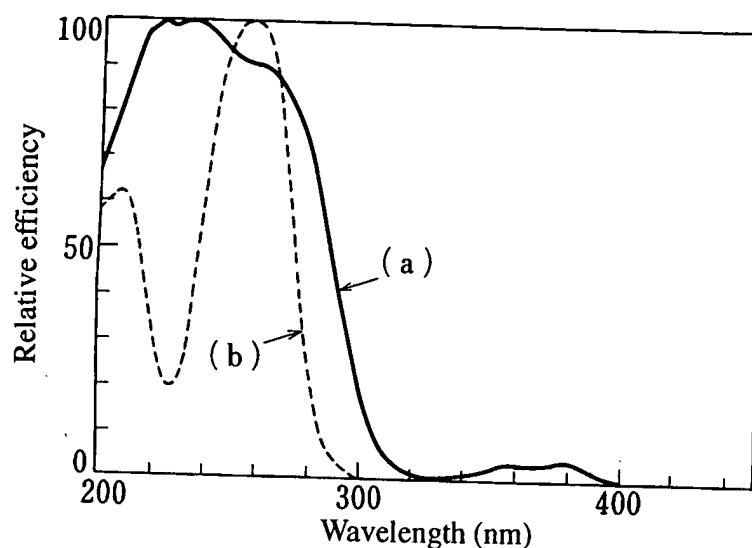

Figure 33 Excitation spectra of (a) $Zn_2SiO_4:Mn^{2+}$ and (b) $CaSiO_3:Pb^{2+},Mn^{2+}$. (From Kamiya, S. and Mizuno, H., unpublished results. With permission.)

Emission characteristics. Under 253.7-nm UV excitation, the $Zn_2SiO_4:Mn^{2+}$ phosphor shows a bright green emission peak located at 525 nm, as shown in Figure 32(a). This phosphor has a strong excitation band in the wavelength range of 200 to 280 nm, as shown in Figure 33(a). Hence, this phosphor is well suited for 253.7-nm excitation. Its quantum efficiency can reach 0.87 with this excitation. Partial replacement of Zn by Be brings about a new emission band with a peak located at 610 nm. By changing the Be:Zn ratio, a wide range of colors from green to orange can be obtained.

Preparation. ZnO, SiO_2, and $MnCO_3$ are commonly used as starting materials. Optimal results are obtained with the mixing ratio $1.5ZnO:SiO_2:0.08MnCO_3$. The mixture is fired at 1200°C in air for several hours. The sintered cake is milled and fired again in air at 1200 to 1300°C for several hours. Although the stoichiometric $ZnO:SiO_2$ ratio is 2:1,